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Mediating Role of Inertia in Organizational Transformation: E-Learning in Higher Education

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Abstract

E-learning involves the operational or strategic use of information and communication technologies. Strategic use has the potential to transform organisations. This study investigates the conditions under which implementation of e-learning is strategic for higher education institutions (HEIs), how HEIs are changed by adopting e-learning, and the role inertia plays in transformation. A multiple case study is adopted. Findings suggest e-learning enables development of new products and entry to new markets, thus e-learning exploitation may be strategic. Two types of e-learning implementers are identified: Experimental e-learning implementers develop new e-pedagogy, undergo radical change and organisational transformation, exhibiting little evidence of inertia and high enthusiasm for innovation. Alternately, designed e-learning implementers undergo convergent, emergent incremental change, inertia is an important factor. Thus, e-learning can play a transformational role for HEIs; inertia mediates the effects of strategic intent in bringing about organisational transformation.

Highlights:

- Investigation as to whether e-learning implementation is strategic for higher education institutions
- Assesses how HEIs are affected by e-learning
- Identifies two types of e-learning implementers
- Investigates radical versus incremental change in e-learning implementers
- Demonstrates how e-learning may be transformational

Keywords: E-Learning; Transformation; Organisational Change, Inertia, E-pedagogy

Mediating Role of Inertia in Organizational Transformation: E-Learning in Higher Education

Introduction

E-learning is learning facilitated through the use of digital technologies (Susarla et al, 2012). It presents an opportunity and a threat to higher education institutions (HEIs). E-learning is widely used in HEIs and, just as other developments in information communication technologies (ICTs) have changed organisations, so e-learning is changing universities. Many stakeholders are active participants or worried on-lookers in assessing the changing the role of technology in education provision (Barber, Donnely, and Rizvi, 2013). This research investigates the impact of e-learning on HEIs. Much e-learning research focuses on learning and teaching. In contrast, this research examines e-learning from an organizational and strategic perspective.

The two key drivers underlying the adoption of e-learning are the needs to up-skill the population to meet the challenges of the knowledge society and the need for accessible and flexible access to tertiary education to meet the changing nature of society and the lifelong learning agenda (Anderson at al, 2006; House of Commons, 2016). Schiffman et al. (2007) identify why HEIs engage in online learning: to obtain new students, contribute to the extension efforts, enhance brand, on-campus student retention, provide pedagogic improvements, increase student diversity, return a surplus to institution, increase student speed to graduation, and reduce or contain costs. Singh and Hardaker (2014) argue that the benefits of learning technologies include access to global markets, involve potential cost reductions for provider and for student, and the ability to enhance and deliver more flexible learning. Cook and Triola (2014) suggest that educational technologies empower some of the key ethoses of education: openness and access; the use of learning outcomes to inform curricula, and lifelong learning. To the benefits Singh and Hardaker proffer, they add analytics that create an evidence base from which to inform the most effective use of technology-enhanced instruction; adaptivity to respond to each student; assessment which allows new methods to assess learners continuously; agility that enables implementation of new curricula faster and more broadly using new ways to connect; and control whereby instructors can oversee course quality and content, and sequence learning to ensure objectives are met. Yet, most of the suggested benefits are about delivery, cost and access to education, and not about changes in learning outcomes or in quality. Researchers (for example, Cook and Triola, 2014; Singh and Hardaker, 2014; Salmon, 2005) argue that the many of outcomes of investments in e-learning so far are poor and the adoption of e-

learning in HEIs has been slow and disappointing. They call for a more robust evidence base, to which this research seeks to add.

The realisation of this vision of ubiquitous and lifelong access to higher education requires a fully articulated e-learning strategy that is transformative of traditional universities (MacKeogh and Fox, 2008). Such a transformation requires that universities have strategies and policies that *'implement flexible academic frameworks, innovative pedagogical approaches, new forms of assessments, cross-institutional accreditation and credit transfer agreements, institutional collaboration in development and delivery and, most crucially, commitment to equivalence of access for students on and off campus' (p.1)*. Yet, Schiffman et al.'s (2007) literature review uncovers a lack of research into the new organizational landscape for on-line learning.

This research explores the impact of e-learning on higher education institutions, through the lens of e-learning as an information system (IS). The first research question asks: is e-learning strategic for HEIs? And as ICTs may bring about a need and an opportunity for change, and enables organizational transformation, the second question is: how are HEIs transformed by e-learning implementation?

This paper is structured as follows. The first section provides the background to e-learning, e-learning strategy and its role in organizational transformation. It then considers e-learning as an information system and the potential this brings to think about its organisational consequences in a novel way. The subsequent section describes the case research method. The fourth section reviews the findings. The final section lays out the conclusions.

E-Learning, strategy and transformation

E-learning involves the electronic delivery of teaching and learning. It comprises a wide range of applications, from a simple website for course materials (Bates, 1996), to using digital technologies for distributed and distance education (Katz and Oblinger, 2000). Much of the e-learning literature examines e-learning pedagogy, technical requirements and application, and many of the social and educational issues raised by e-learning. There is some work investigating the organisational requirements for e-learning, organisational e-learning strategy, or the transformational impact e-learning has on HEIs. E-learning involves new technology for universities, it requires new skills in on-line pedagogy and the use of digital media for teaching and learning, it also enables HEIs to enhance learning and teaching, deliver new products, and to enter new markets.

E-learning can be defined as learning supported by information and communication technologies (Sambrook, 2003). Such a definition embraces a wide range of e-learning exploitation from the use of simple teaching aids such as PowerPoint, to using the Internet for distance learning. This definition is, however, too broad to be useful to guide research. Uses of different types of e-learning can differ substantially. Further, e-learning applications differ in the way they affect HE. Some applications have a marginal effect on pedagogy and organizational structures, while others require a new pedagogy, an e-pedagogy, and complex uses can engender organizational change. Thus, e-learning is better understood as a continuum with simple teaching aids at one end and complex IS at the other (Figure 1).

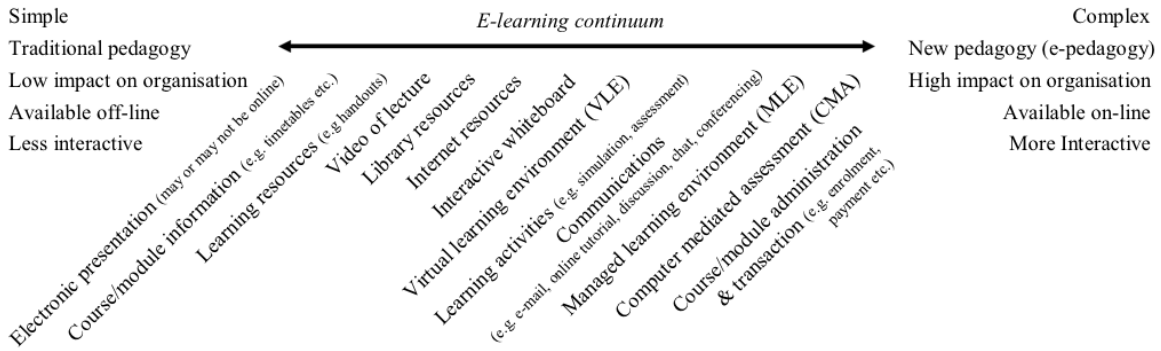

Figure 1 E-learning technology continuum

Some, or all, of these components may be present in an e-learning experience. Some stimulate new pedagogy, some induce organisational change, but each component may be used without substantial change to pedagogy or organisation, although not necessarily used well. There are systemic and synergistic issues that go beyond the components of e-learning and e-learning may take place with various combinations of components, and for a variety of reasons. At the simpler end of the continuum the use of e-learning technology is little different from traditional teaching methods. However, at some point, e-learning does require a new pedagogy in order to exploit fully its teaching and learning opportunities offered which can, in turn, bring about organizational change. If HEIs are to manage e-learning effectively they need to consider the strategic and transformation opportunities and the implications, rather than viewing it as a pedagogical initiative.

E-learning as an information system

E-learning is predominantly researched from a pedagogical perspective. In contrast, this research treats e-learning as an information system. This allows IS theory to be employed understand how organisations may exploit e-learning. Considering e-learning as an information system that involves the components

identified in the continuum of e-learning (Figure 1) permits investigation of the strategic and transformational role of e-learning in HEIs. IS combines technology and human activities within an organisation, including managing the IS function itself (Avgerou and McGrath, 2007). An organisation's IS are the IT and its infrastructure, the data and application systems, as well as the people that deliver ICT services, including the management, planning, designing, developing, implementing and operation of those systems and services (Davis, 2000).

There are a number of IS-related methods that can be used to study e-learning and organizational transformation. IT can unfreeze organizational structure, creating a need and opportunity for change, and in so doing, alters the rules by which organisations operate (Porter and Millar, 1985) bringing about organisational transformation (Venkatraman, 1994). As new IT is introduced it has effects on the organisation. Some effects concern how the system is used, these are first order effects; others concern the system's impact on individuals, groups, and the organisation: second order effects.

In order to examine e-learning in HEIs from an organisational and strategic perspective, using the lens of IS, this research first develops a model (Figure 2) of the mediating effect of inertia on the levels of organisational transformation. The development of the model is explained in the following sections.

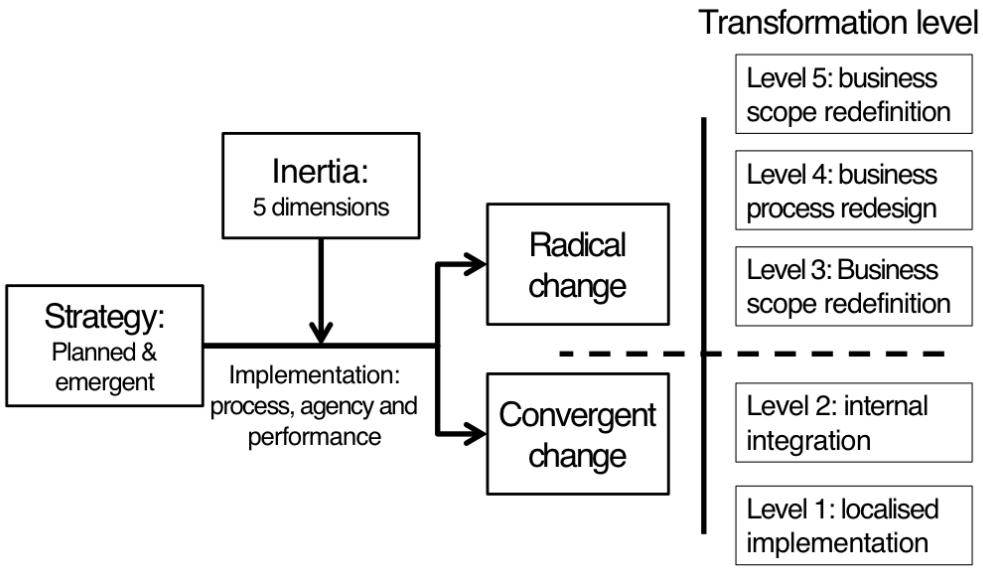

Figure 2: mediating effect of inertia on 5 levels of organizational transformation

E-learning Strategy

A number of studies have identified sets of criteria that seem to be associated with success, or failure, of e-learning initiatives. These studies are synthesised by Singh and Hardaker (2014) who argue that successful adoption depends on the ability of management to create a culture of trust, creativity and collaboration and upon a supportive administrative and technical infrastructure. Academics' perception of the relative advantage of adopting e-learning over other methods, and ease of use are factors determining adoption as well as personal motivations, feelings of ownership. For Rosenburg (2001), e-learning success depends on support which entails a culture that encourages information sharing, a readiness to invest in infrastructure, and for trainers to design learner-centered curricula. Such a culture requires suitable knowledge management. Yet, these studies do not, in themselves, identify whether or not e-learning developments are strategic.

In order to determine whether e-learning exploitation is strategic, it is necessary to identify HEI approaches to strategy. Singh and Hardaker (2014) distinguish between macro-level studies examining the context of e-learning and micro-level studies that focus on individual and social factors and on the management issues of adoption and diffusion of technological innovations. The macro-level approaches focus on e-learning strategies, the role of management and support structures. Again, neither of these approaches assesses whether e-learning is strategic for any HEI.

Ansoff's (1965) growth vector matrix may be adapted to assess whether e-learning is strategic (Figure 3): product becomes programs, mission becomes strategic. In the first inner cell of the matrix a current program and non-strategic use of e-learning becomes '*acquire more students'*: there is no product development, no new types of students, merely growth within existing programs. With this level of use, e-learning becomes just another tool in existing teaching and learning, and is not strategic. In the new programs/not-strategic cell, '*Develop current programs'*, e-learning is used to enhance and develop existing programs. There are still no new products or markets, merely improved existing products, and e-learning is not strategic. In the strategic/present programs cell e-learning is used to enter new markets with existing programs, and thus becomes strategic. In the strategic/new programs cell e-learning is used to develop new programs, and consequently is strategic.

Programmes / Strategic	Present	New
No	Acquire more students	Develop current programme
Yes	New markets	Develop new programmes

Figure 3 is e-learning strategic? (Adapted from the Ansoff (1965) growth vector matrix)

Given that e-learning may, or may not, be strategic, Herbert and Deresky (1987) offer a means of identifying strategic position through a generic categorisation of strategy, highlighting four generic strategies: *Develop, Stabilize, Turnaround, and Harvest*, which are typically associated with stages of product-market evolution and/or corporate life-cycle. Organisations operating under a '*Develop*' strategy are typically those with rapidly changing technology or product line, seeking to enter new fields as a reaction to current or imminent competition or stagnation of markets (Herbert and Deresky, 1987). The prime goal for the '*Develop*' strategy is long term growth by developing new product and market opportunities. Organisations operating under a '*Stabilize*' strategy are typically mature, stable organizations, with a goal of remaining viable in a homogeneous market by competitive pricing. Organisations operating under a '*Turnaround*' strategy seek to survive while suffering under financial constraints and redirect organisational focus. The '*Harvest*' strategy is used for wind-down, sale or liquidation (Herbert and Deresky, 1987).

HEIs that adopt e-learning to develop new product or market innovation can be categorised as being in the strategic row of the Ansoff matrix, and having a '*Develop*' strategy using the Herbert and Deresky categorisation. The next section considers how strategic positioning may transform the organisation.

Organisational transformation

Organisational transformation (OT) is generally understood to be a process that engenders a change that leads an organisation to become a qualitatively different organisation (Besson and Rowe, 2012). IS can be a major source of organisation transformation due to the disruptive nature of IT, the digitalisation of businesses and cross-organisational and systemic effects (Besson and Rowe, 2012). This research views e-learning in HEIs as an example of new technology becoming an integral part of organisational activity. It is an indispensable part of administration and learning and teaching; it is embedded in organisational

strategy as students expect e-learning to be integral to their university experience, and university management is dependent on the campus VLE and MLE to communicate with students, integrate course and module registration and manage timetabling.

The literature identifies two type of OT (Besson and Rowe, 2012): convergent change (Tushman and Romanelli, 1985) and deep structural change (Gersick, 1991). Convergent change occurs within relatively stable structures, and takes place without the rethinking of organizational business model or key processes (Besson and Rowe, 2012). In the case of UK HE, it may be that actors think they are engaging in convergent, incremental change, but the effect of many such changes taking place, in parallel or sequentially, leads to emerging deep structural change.

Convergent change is incremental, occurring in a relatively stable environment where change emerges without a wholesale rethinking of business models (Bharadwaj et al, 2013); while deep structural change is radical and disruptive. However, the terms incremental change and radical change can be confusing, as incremental change can bring about deep structural change emerging from a series of incremental changes. Consequently, Besson and Rowe (2012) propose the terms convergent change – which is always incremental - and radical change – which brings about deep-structural change. They identify a '*state-of-the-art*' approach for analysing OT using four structuring themes of '*organizational inertia, process, agency* and *performance'* (2012, pp.104).

Organising requires routinising, which creates different forms of inertia (Hannan and Freeman, 1984). Inertia determines the propensity of the organisation to resist changes to its routines and processes: organisational '*stickiness*', the resistance to upheaval (Bharadwaj, et al., 2013). Inertia can be divided into five dimensions (Besson and Rowe, 2012): *negative psychology, socio-cognitive, socio-technical, economic,* and *political*.

The mediating effect of inertia on strategy implementation that may cause organisational change can be mapped to Besson and Rowe's (2012) two types of change, incorporating the four structuring themes (Figure 4).

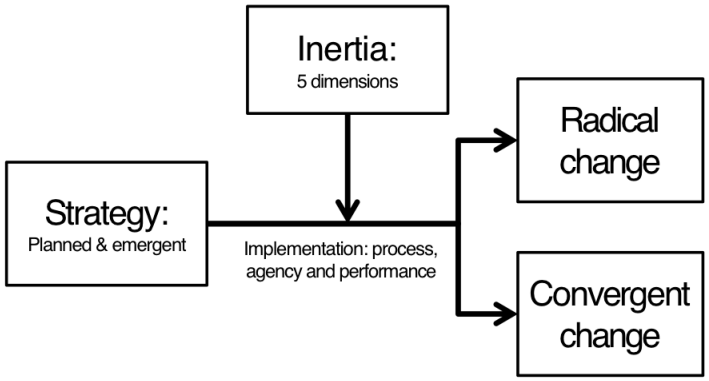

Figure 4: Effect of inertia on organizational change from strategy implementation

The research model, thus far, identifies strategic intent, types of change, and the dimensions of inertia that mediate change. The final element seeks to understand the extent of any transformation using the work of Venkatraman (1991, 1994) who breaks down IT-enabled change into five levels (Figure 5), which provides a framework that can be adapted for studying e-learning. Each level of the framework is built on the activities of organisational actors, it considers the effects of technology on an organisation, and is suitable for research that has an organisation as its unit of analysis, looking at how organisational actors use technology and cause the organisation to change.

The first level is *localized exploitation*. This takes place at a relatively low level within the organisation. It is for local functionality, there is little impact and little organisational learning. The second level, *internal integration,* and attempts to bring benefits across the organization. It involves integrating existing systems, bringing benefits from interoperability across common platforms, and of different processes and roles within the organization. Venkatraman (1991) suggests that the first two levels are evolutionary, and require only incremental change to existing systems and practices. The next three levels are revolutionary, requiring fundamental changes to how the organization works. The third level is *business process redesign*. This involves reconfiguring the organisation with IT as the focal point. Business process redesign goes beyond merely superimposing new IS on the business processes, it involves aligning processes to IS. Level four is *business network redesign* involving the use of technology capabilities to change business processes inside the organisation, and outside across the supply network. The final level of reconfiguration is *business scope redefinition*: re-thinking what the organisation is about, its purpose, and its mission.

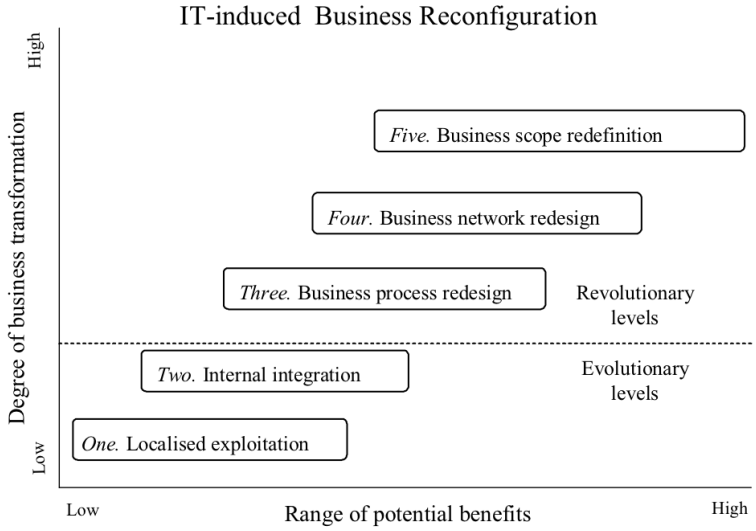

Figure 5: Five Levels of IT-induced Business Reconfiguration (Venkatraman, 1991)

Studies demonstrate local IS strategy emerging from interaction between actors within the organisation (Besson and Rowe, 2012). Rather than beginning with strategy formulation, emergent strategy may begin with the tactical and incremental adoption of technology. This brings change in individual roles and skills, then structural adaptation, followed by changed management processes, bringing about organisational learning (Mistry, 2008). Orlikowski's view of situated change is of innovation involving exploration and local improvisation (Orlikowski, 1996). Exploration is experimentation with IS in order to develop new ways of using it, seeking innovation, building new initiatives. Exploitation is the refinement of existing uses of IS so as to improve existing processes practice to create value for the organisation (Bharadwaj, et al., 2013).

Venkatraman's (1991) five level model of information technology-induced organisational transformation suggests that at the higher levels of exploitation organisational change is transformational. So exploitation of e-learning may lead to organisational transformation and, thus, suggests that engaging in e-learning can be strategic.

This research views strategic intent as being either '*change by design'*: planned strategic change arising from deliberate top-down strategy; or '*change from experimentation'*: emergent change arising from exploration and local improvisation. As strategy is enacted, routines and processes are changed. This can bring about organisational change and even transformation, but the degree to which the organisation is

able to change is determined by the '*stickiness*' of existing routines and processes. Thus, inertia is viewed as a mediating effect on organisational transformation. Combining these elements allows the construction of the model that guides the research (Figure 6).

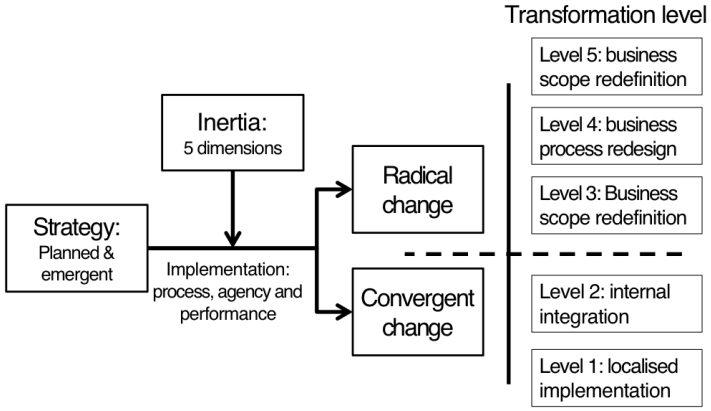

Figure 6: mediating effect of inertia on 5 levels of organisational transformation

Method

Case study is an empirical study investigating a contemporary phenomenon in a real life context. Yin (1994) states that case study is applicable where the research question asks '*how*' or '*why*'. It is applicable where control over behaviour is not required, and where there is a focus on contemporary events. The unit of analysis here is the HEI. This research adopts a multiple case study approach, interviewing participants in seven UK HEIs. Data was gathered in the form of interview transcripts and documents. A number of people in each HEI were interviewed, providing a range of opinions and reports of practice. The use of semi-structured interviews provides a framework for identification of competencies and capabilities, while allowing sufficient freedom for interviewees to report important data.

The seven HEIs are all research and teaching institutions with undergraduate, and taught and research postgraduate, courses. All cases use learning technologies, and all have, to some extent, programmes of study delivered at a distance. Although one is purely a distance learning institution, the remainder are traditional, campus-based organisations.

Case selection

Rouse and Daellenbach (1999) offer a four step process for selecting suitable cases. The first involves ranking cases in the selected industry using secondary sources. Here the industry is HE and the secondary sources used to rank cases were the *Times' Good University Guide* and the Government-led research

excellence framework (REF). The second step clusters organisations by strategic group within the sector using at least two typologies to support the cluster, with the suggestion of using Herbert and Deresky's (1987) approach. This study selects UK public universities, (grouped by commonalities such as funding sources, quality assessment regime, and student selection), classifying the selected sample as having a '*develop*' strategy. The third step is to compare performance indicators looking for differences in performance. The final step is to identify high and low performers using the indicators.

The Times newspaper's Good University Guide rates HEIs by a number of performance measures. The Guide is a popular tool for students, school careers advisors, and parents to use in choosing a university. The REF is a rating tool used by UK Government to determine the perceived quality of research, and it is the basis of funding levels. Therefore, as a result of common practice in the UK - students using the Times' Good University Guide, and the Government using the REF as a means of deciding research funding levels to universities - these two systems of performance measure are used here as a proxy to assess university performance.

Two cases in the sample are in the upper quartile of both the Times' ranking and the REF, while two are in the lower quartile. Rouse and Daellenbach (1999) argue that selecting out the central group allows a more stark comparison of differences. However, this study also chooses three further cases. One is unranked but is a renowned innovator and user of e-learning, another is in the middle of the ranking of both indicators. Case seven is e-learning active and used to add another perspective to the study since it derives little research funding from funding councils and is therefore teaching-led. The cases are arrayed in Table 1.

Case	Size	Research	E-learning	Distance / Local	Rankings
1.	Large	Active	Active	Distance not a focus, local e-learning delivery	Upper quartile
2.	Small	Active	Active	Distance not a focus, local e-learning delivery	Upper quartile
3.	Large	Active	Active	Mainstream distance courses, plus local e-learning delivery	Middle
4.	Large	Less active	Active	Delivers courses at a distance via partner organisations, plus local e-learning delivery	Lower quartile
5.	Large	Active	Active	Solely distance learning	Not ranked
6.	Large	Less active	Less active	Distance not a focus, local e-learning delivery	Lower quartile
7.	Small	Less active	Active	Distance not a focus, local e-learning delivery	Not ranked

Table 1: Cases Selected

Data collection

Data collection was through semi-structured interview. Subjects were chosen from different organizational positions so that data might be triangulated. Prospective interviewees were selected from websites to identify those who appeared to be e-learning active. Interviewees were asked to recommend other candidates for interview. The interview protocol guided 30 subjects through their personal experiences with e-learning, their experience of how others, and the organization, were affected by e-learning. Semi-structured interviews allowed subjects to raise points they felt important. The interviews were recorded, transcribed and coded into individual protocols, or statements.

The research data is in the form of interview transcripts and notes. Statements by interviewees were coded and sorted into themes identified in the literature review, and sub-themes and additional themes that arose from the data. In some instances interviewees made clear statements that were used to identify areas of importance, other themes emerged from the data where interviewees identified issues, processes and capabilities. The interviewees were numbered, as were the cases and each interviewee was describe by their institutional role.

Findings

The data is sorted into themes. To start, these are the themes that emerged from the literature review:

Strategy

- *Change by design:* planned strategic change arising from deliberate top-down strategy;
- *Change by experimentation:* emergent change arising from exploration and local improvisation.

Inertia

- *Negative psychology inertia:* Denial, fear of learning about technology, perceptions of threat
- *Socio-cognitive inertia:* Norms and values re-enactment at individual, group, organizational, industry, society levels
- *Economic inertia:* Economic path dependency where business models exhibit idiosyncratic dynamics
- *Socio-technical inertia:* Technological and socio-technical path dependencies where systems exhibit idiosyncratic dynamics
- *Political inertia:* Vested interests and alliances embedded in networks with individual dynamics.

Levels of transformation

- *localized exploitation*: low level within the organization, local functionality, little organizational learning.
- *Internal integration:* integration of existing systems, interoperability.
- *Business process redesign*. reconfiguring the organization with IT as the focal point, processes are redesigned to maximize exploitation of the new IT, aligning processes to IS.
- *Business network redesign*: change business processes inside the organization and outside across the supply network.
- *Business scope redefinition*: re-thinking the organization, its purpose and mission.

Analysis

The first part of the research framework (Figure 6) concerns strategy. Interview data is analysed to determine the organisation's strategic approach. The first finding is that case organisations fall into two e-learning categories. Organisations where individual academics are free to experiment with e-learning tools as they saw fit: '*experimental implementers*'. Here, academics appear to fit Mintzberg's (1989) model of the professional organisation where management are in a support role; principal stakeholders are: students, academics and IT services. Design of e-learning is intentional and experimental (Besson and Rowe, 2012). Strategy here is emergent. Organisations in which there is a strategic planning objective in using e-learning, where strategy is top-down and designed: '*strategic design implementers*'. Here, academics appear to fit into a more bureaucratic organisational model (Mintzberg, 1989): management strategize, plan and design, academics follow strategy and carry out their role in those plans. Design of e-learning is often reluctant, subject to inertia, but often conforms to, and is constrained by, the organisation's plans. Each category could be seen as an ideal, at different ends of a continuum, while in reality cases may fall somewhere in-between. Within cases, individuals fall into three categories, first, those using e-learning for their own teaching, without significantly changing their teaching methods or style. Here, socio-cognitive inertia appears to be evident as extant routines from the off-line environment are re-enacted online. Some of this group was not particularly IT-literate and needed support from IT staff and or educational technologists. Here, negative psychology inertia is evident in the form of denial (Besson and Rowe, 2012).

Second, those using e-learning for their own teaching and significantly changing their teaching, discovering a need for new pedagogical approach. This group relied upon assistance of educational technologists, and sometimes librarians, to help use, and make better use of, e-learning tools, and to help

in developing an e-pedagogy. There appears to be no evidence here of inertia, quite the contrary, these actors are e-learning champions actively driving and creating change.

The third group uses e-learning in concert with others, as a part of an organisational strategy to introduce e-learning across the university, or to distance learning students. E-learning strategies in this category may be based on voluntary use by individuals, or on persuasion to adopt, or on a contractual basis. Where there is a need to persuade actors to adopt e-learning, overcoming inertia is an important element in exploiting new technology.

Experimental Implementers

Each finding deserves richer interpretation. First, in the category of experimental implementers, individual academics experiment with e-learning tools, using them in building e-learning into their teaching. Whilst such a case is categorised as being different from strategic design implementers, the institution is not passive. In these cases the organisation is active in providing software, platforms, servers, and support in the form of staff training, seminars on e-learning exploitation, and educational technologists helping individuals to implement their e-learning initiatives. They are categorised as being different from the strategic design implementers as e-learning is being implemented as a result of bottom-up pressure, albeit with support and encouragement from institutional management. E-learning here is not implemented to any overall design or plan, there is no e-learning strategy written or, apparently, enacted. There is a pervasive feeling that e-learning is a good thing. Inertia is not in evidence here. Academics, e-learning technologists and management decision makers form a loose-knit network of weak ties within and outside of the organisation, driving innovation (Granovetter, 1973).

Experimental exploitation is a bottom-up process led by those who choose to develop e-learning. Those individuals who chose to use e-learning are enthusiastic, inquisitive, form links with other enthusiasts, and experiment. For these implementers, e-learning is treated as another research interest, with communities and conferences. Inertia is not evident here: enthusiasm is. Many of the interviewees in this group have written on e-learning, and presented seminars about their practice. Inside institutions in the experimental implementer category there is much learning going on, and all the cases had a mixture of short-term project teams whose knowledge may leave the organisation at the end of the funding, and long-term centrally-funded e-learning teams whose knowledge remains. Thus, institutional learning takes place, but it is questionable how much the organisation knows what it knows.

There are unintended consequences of adopting e-learning technology. As use increases, so the failure of different IS across the institution to work together is exposed. This leads to programmes of systems integration. This, in turn, leads to greater automation of administrative duties, recognition of the benefits of more powerful and better integrated e-learning tools, and a cycle of technological change along with greater opportunities for e-learning. The principal driver for experimental implementers is an enthusiasm for innovation and experimentation.

Strategic design implementers

Strategic design implementers formulate some form of institutional plan for adopting e-learning. Strategic design implementers differ from experimental implementers in that they adopt policies to encourage or pressure e-learning use, overcome inertia, regulate e-learning activity, and develop e-learning initiatives as a top-down strategic approach. This is not necessarily through a top-down, rational, stepwise strategy, although such strategies do exist, it could be through the establishment of institutional policies requiring the use of certain e-learning tools, such as a virtual learning environment (VLE), and requiring academic staff to engage in at least a minimal way, such as creating a module web page and placing course timetables and materials on it. Strategy implementation may be more forceful, for example contracting academics to write e-learning materials, to tutor students via e-learning tools, or to work with partner organizations in aspects of delivering e-learning. The findings include one instance, Case 4, where contract work is used to implement clear institutional strategic plans. Another, Case 5, has similar activity where staff are hired specifically to engage in e-learning delivery. However, both cases have other staff not contractually obligated to use e-learning. They are free to use or not use e-learning, but the institutions attempt to persuade them to do so, attempt to overcome inertia, and offer staff development and support as a carrot, and express organizational policy pronouncements, along with quotas, as a stick. This latter activity caused tension in both cases. All five dimensions of inertia may be present (Besson and Rowe, 2012): *negative psychology inertia*: denial that e-learning is needed, fear of learning about e-learning, perceptions that e-learning presents a threat to their role as academic; *socio-cognitive inertia*: extant norms and values are re-enacted at the individual, group, and organizational levels as staff cling onto existing practices; *socio-technical inertia*: technological and socio-technical path dependencies where systems exhibit idiosyncratic dynamics and technical support staff and IT services departments struggle to accommodate new ways of working and struggle to support new technologies; *economic inertia*: economic path dependency where organisational structures and processes exhibit idiosyncratic dynamics; and *political inertia*: where vested interests and alliances within the organisation exhibit resistance to change. A third case, case 3, is implementing e-learning as a distinct separate business unit.

The principal driver for strategic design implementers is business opportunity and therefore economic and political inertia is evident. Institutions perceive an opportunity to increase market share. In Case 4, this is through expanding distance learning through strategic alliances, reaching new markets, implementing policy through contractual means. Case 5 perceives an opportunity to increase market share through e-learning, but to improve existing delivery, using synchronous and asynchronous communications capabilities. Case 3 identifies business opportunity for new distance learning initiatives, as well as perceiving opportunities to benefit from experimental exploitation coupled with carrot and stick persuasion.

Singh and Hardaker (2014) argue that top-down approaches are typified by senior management developing an e-learning strategy that is expected to be embraced by academic staff and that top-down strategies that push learning technologies may be counter-productive and can have a negative influence on academic staff.

Localized E-Learning Implementers

The findings show three categories of individual use that cuts across both experimental and design strategies. First, localized e-learning implementers using e-learning for their own teaching, but without significantly changing teaching methods or style. Localized users engaged with e-learning tools of various types, but do not reach beyond existing teaching methods, whether face-to-face or distance, and do not develop new pedagogy. Norms and value re-enactment indicates socio-cognitive inertia. There are a number of examples of lecturers using VLEs merely as repositories for course timetables, reading lists, and handouts, but localized usage is not confined to face-to-face teaching. An example is a lecturer developing relatively complex e-learning activities for distance learners, but maintaining the traditional approach of presenting reading materials, lecturing, requiring an essay, and a piece of set course work and exam as summative assessment. The course design is no different from when it was in a face-to-face context. Sharpe et al. (2006) identify that sustainable embedding of effective e-learning requires flexibility in practices so that individual academic units can contextualise their plans for change, it needs facilitation of communities of key staff and the creation of opportunities for staff to voice their beliefs about e-learning.

E-Pedagogy Developers

The next category of e-learning user is that of e-pedagogy developers. These are academic staff, invariably working alongside others such as educational technologists, using e-learning for their own teaching, but significantly changing their teaching and discovering a need for new pedagogical approaches. The principal difference between the developer and the local implementer is that the developer recognises that e-learning tools can enable interactive engagement between students and textual, aural, visual, and communicative content. Students can read text at their own pace. It is possible to offer different paths through the learning materials depending on ability, understanding, and interest. Students can be led through research activities using links to on-line library resources, and to resources beyond the organizational boundaries. They are able to listen to lectures at their own pace, replay on demand, see dynamic diagrams and simulations, and run simulations themselves. The communications capabilities enable students on or off campus to interact with discussion boards, computer-mediated conference, or chat, and to seek feedback on their work. Some students participate in on-line discussion who would be reluctant to do so face-to-face, and here e-learning may broaden student participation. A category of learning by lurking is apparent. Lurkers do not actively participate in discussion, but as passive participants '*listen in*' by reading what is posted by others. Lecturers in the e-pedagogy category are enthusiastic about e-learning. It is enthusiasm for innovation – the opposite of inertia – that is a key driver.

Contractual Implementers

The third category is contractual e-learning implementers. Academics in this category use e-learning in concert with others, as a part of an organizational strategy to introduce e-learning across the institution. This theme emerged from the data. The practice of contracting-in e-learning practitioners is a means of bypassing all forms of inertia, especially where self-contained e-learning units operate outside of the organisation's mainstream teaching and learning departments. However, in practice they could fall into either of the first two categories, i.e., local implementer or developer. Some were enthusiastic and developing new pedagogy, others less so, employing traditional methods. It could be argued that there are just two categories of individual, local implementer and developer, and that the contractual aspect is another dimension that is orthogonal to local implementer and developer since it can apply to both.

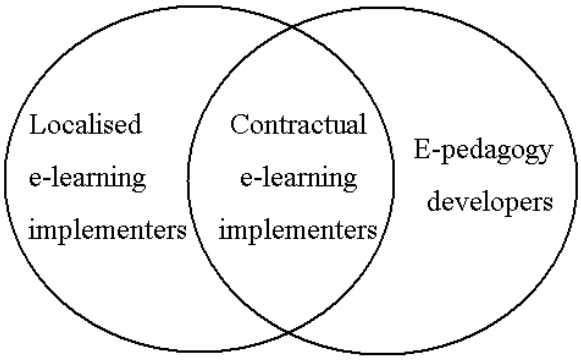

Figure **7:** Types of e-learning implementers

Transformation Findings

This research seeks to understand the effects of e-learning on institutions. One mechanism by which this may be assessed is the five categories of Venkatraman's (1991) IT-induced reconfiguration framework, which is mapped on to a new model of e-learning induced HEI reconfiguration (Figure 8).

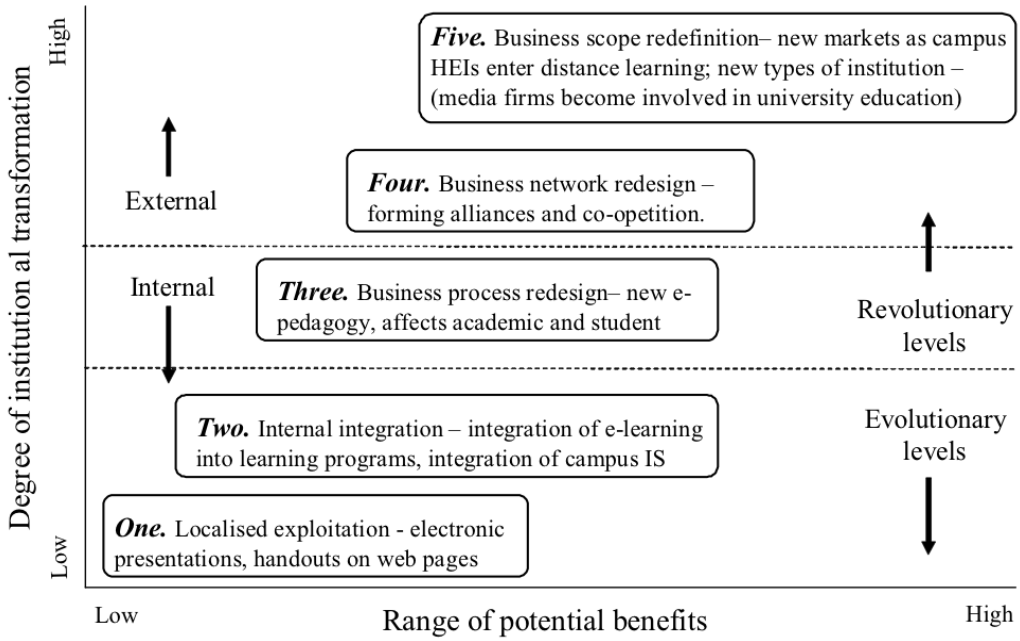

Figure 8: Five levels of e-learning-induced HEI reconfiguration

The first level of the framework is localized exploitation and the decision to implement is devolved to local managers, resulting in little organizational learning and the benefits gained are widely realised by competitors. The data suggests that level 1 exploitation is not as a result of management decision, but is

devolved to academics. There is little need for new technology or software. At this level there is little impact on pedagogy, or on the organisation: it is the work of the local implementers.

Level two includes integration of processes, and of systems. Here the integration of e-learning into learning programs may involve the use of a VLE. Interconnectivity is achieved via the common platforms of intranet, extranet or Internet, and once a VLE is used it becomes evident that systems require integration across campus, resulting in another level of interconnectivity. The use of a VLE involves the integration of e-learning across modules, courses, departments, and, in some cases, across institutions. Venkatraman (1991) discusses cases of level two exploitation where data gathering and analysis affects firm performance. This occurs with e-learning as VLEs enable student performance data to be gathered and analysed leading to more focused attention to individual student needs leading to improved student achievement. Finally, Venkatraman describes the disappointing observation that organising implementing at level two usually pay more attention to technical interconnectivity than to interdependence of processes. This study finds evidence of greater attention to operability of VLE or intranet than integration of e-learning processes. This supports Laurillard (1993) and Timmis (2003) who find e-learning is often implemented with much emphasis on technology, and often based on short-term projects.

In level three, the data suggests that there is a point at which e-learning enables redesign of the learning process. Once there is a certain level of interaction between student and e-learning software, there is a possibility of new teaching and learning activities, and a new set of relationships between student and tutor, student and student, as well as student and institution. The point at which this happens appears to depend on the individuals involved and the institution. Further study is required to understand better this phenomenon.

Business network redesign may involve changes to organizational boundaries. Venkatraman cites examples of types of functionality. Transaction processing is one example, with e-learning this is enabled by managed learning environments (MLEs) which allow on-line enrolment on courses and modules, and on-line payments. At this level the institution starts to relinquish some control over the supply chain as the supply network is redesigned. As organisations require specialised e-learning tools some relationships with providers are simple buyer/vendor relationships, but some cases went further forming alliances with publishers or software houses in the production of e-learning. In business scope redesign at level five, Venkatraman suggests that institutions question the purpose and the scope of their organisation. At the higher levels of e-learning exploitation institutions may enter new markets, for example, as campus HEIs

enter distance learning, or may form new types of institution, for example where a university becomes involved in writing e-learning software, or the reverse where a media firm becomes involved in delivering university education. The Venkatraman framework appears to fit well with e-learning exploitation, and there are clear examples of fit as e-learning is mapped to the five levels of IT-induced organisational transformation. However, all the cases consider themselves to be still learning how to best deploy e-learning, and while there are fewer examples of level four and five transformation these may increase as institutions develop their use of e-learning over time.

Figure 9 maps the levels of change, using the new model of e-learning induced HEI reconfiguration to each case organisation. The analysis illustrates the opportunity to classify e-learning by the impact on institutions.

	Cases:	**1**	**2**	**3**	**4**	**5**	**6**	**7**
	Institutional approach: ***Experimental Ex*** ***Strategic St***	**Ex**	**Ex**	**Ex & St**	**St**	**Ex & St**	**Ex**	**Ex**
	Individual approaches: ***Local implementer L*** ***Developer D*** ***Contractor C***	**D**	**D**	**L D C**	**L C**	**D C**	**L D**	**D**
	Institutional Level:							
E-learning complexity: Simple → Complex; Degree of institutional transformation: Low → High	***Five*** Business scope redefinition: •new markets as campus HEIs enter distance learning	No	No	Yes in specific courses	Yes in specific courses	No	No	No
	•new types of institution (media firms become involved in university education)	No	No	Yes in specific courses	Yes in specific courses	Existed prior to e-learning	No	No
	Four Business network redesign: •forming alliances and co-opetition.	No	No	Yes in specific courses	Yes in specific courses	Existed prior to e-learning	Yes in specific courses	No
	Three Business process redesign: •new e-pedagogy affects academic and student	Yes, where e-learning is used	Yes, where e-learning is used	In some courses	Not in most courses	Yes, where e-learning is used	Yes, where e-learning is used	Yes, where e-learning is used
	Two Internal integration: •integration of e-learning into learning programs	Yes, where e-learning is used	Yes, where e-learning is used	In some courses	Not in most courses	In some courses	In some courses	In some courses
	•integration of campus IS	Some	Some	Some	No	Some	Some	Some
	One Localised exploitation: •electronic presentations •handouts on web pages	Yes, where e-learning is used	Yes, where e-learning is used	In some courses	In most courses	In some courses	In most courses	In some courses

Figure 9: Cases mapped to e-learning exploitation and the 5 levels of institutional transformation

At the lowest level in Figure 9 there are some institutions that have e-learning exploitation across virtually all courses. This does not imply that all academics on all courses have localised exploitation of e-learning, but that e-learning is rolled out across the institution, and that it appears that all courses use localised exploitation of e-learning to some extent. The cases are shown in Figure 6 as having '*in some courses*' or '*in most cases'*. This indicates that localised exploitation takes place, in some or most courses respectively, across the institution. Singh and Hardaker (2014) suggest that the adoption of learning technologies applications often occurs in isolation from institutional infrastructure, and are manifest as small-scale initiatives that rely on the efforts of local enthusiasts and goodwill.

At level two exploitation systems become more complex, and making integration work is increasingly difficult. Figure 6 shows that level two integration occurs in some cases where e-learning is implemented, in others e-learning is still only at level one in some instances, with systems integration being the key to institutional process integration. Level three process redesign occurs in five of the seven cases, which suggests that some institutions are skipping level two integration and forging ahead with the redesign of teaching and learning and institutional processes. This raises questions about whether or not there is a smooth, incremental progression from one level of exploitation to the next. For e-learning it does not appear to be so. Since much of e-learning exploitation is occurring without implemented institutional strategy, it raises questions about whether institutions are undergoing transformational change without strategic planning, or perhaps without institutional knowledge.

Level four e-learning exploitation brings about the building of alliances and partnerships in the design and delivery of learning, and in some cases on-line transaction processing in the form of on-line enrolment and payment of fees. Alliances can be with institutional partners in the delivery of face-to-face or distance teaching and learning, the development of teaching and learning content, or technology or software development. Partners can be other public institutions, or businesses in the private sector. Figure 9 shows three of the seven cases developing new external partners in the exploitation of e-learning, one only with existing partners, and three which have not entered into partnerships or alliances. The three level four implementers have all largely skipped level two exploitation, and one has largely skipped level three exploitation as well. This appears to confirm that there is not an incremental progression from one level of exploitation to another. The only evidence of level five e-learning implementers were two cases which became providers of distance teaching and learning, whereas in the past they had been primarily campus-based face-to-face providers. It is questionable whether this is truly changing the purpose and scope of the

organisation. If they were a provider of higher education in a face-to-face setting, and now provide higher education to distance learning students, there is some change in market reach, but they are still HE providers.

Institutions that are experimental implementers are heavily involved in developing new e-pedagogy, indicating that they are at level three exploitation, which suggests that they are in the process of revolutionary transformation (Figure 6). However, none appear to be aware of this. Such organisations are following a bottom-up approach to exploitation, and as such may not be institutionally aware of what is happening in e-learning. That is to say that they may be unintentionally, or even unknowingly transforming.

Those following a deliberate strategic exploitation may be trying to transform but are less aware of how to develop the new e-pedagogy because of the lack of experimentation, and, as such, are only at level two exploitation, believing themselves to be at level four or five exploitation. Those cases that are following both experimental exploitation and strategic exploitation may be in a position to benefit from transforming and knowing about it, or even planning transformation. But the data suggests that this is not so, and that, while e-pedagogy might be being developed, and strategy enacted, those individuals who are e-pedagogy developers are using the new pedagogy, while those who are implementing as a result of organizational control are effectively local implementers. Without an understanding that there are two types of simultaneous exploitation they experience tension in exploitation, and may or may not be aware of the potential transformation they are undergoing, and may not be in a position to strategically plan that change. All cases are developing or re-visiting their e-learning strategies. Whether those strategies consider organizational transformation is uncertain.

Conclusions

The findings demonstrate that e-learning delivers new products. One set of these is in the form of re-engineered on-campus and distance teaching, and learning processes delivered in an interactive way. Another new product is communications available outside the geographic and chronological boundaries that restrict conventional campus and distance communications, and enable virtual communities of students, synchronous and asynchronous student-tutor communication, and on-line assessment for distant students.

The findings demonstrate that e-learning enables entry to new markets. Students who would otherwise be unable to attend on-campus university study due to geographic or chronological constraints can attend campus-based courses supported by e-learning, while continuing with work or caring commitments. There are students unable to attend campus in the UK, but are able to study with a UK institution while living overseas. These new markets offer HEIs opportunities to increase student numbers through the use of e-learning.

In addressing the first research question, which asks whether e-learning is strategic for HEIs, this research establishes that e-learning enables the development of new products and entry to new markets, thus e-learning exploitation can be categorised as strategic in such cases. Research question one is again answered, this time in terms of transformational change identified by the Venkatraman model of IT-induced transformational change. The treatment of e-learning as an IS is a contributions here - the analysis illustrates the opportunity to classify e-learning by impact on institutions.

To address the second research question, the findings show that those institutions that are experimental implementers are heavily involved in developing new e-pedagogy, indicating that they are at level three exploitation, which would suggest they are in the process of revolutionary transformation. Those following a deliberate strategic exploitation may be trying to transform, but are less aware of how to develop the new e-pedagogy because of the lack of experimentation, and, as such, are only at level two exploitation, believing themselves to be at level four or five exploitation.

The two types of e-learning implementers identified are subject to different levels of inertia. Experimental e-learning implementers, heavily involved in developing new e-pedagogy, are undergoing radical change in the process of revolutionary transformation, inertia to change is not evident, enthusiasm for innovation is; strategic e-learning implementers are undergoing convergent, incremental change, inertia is an important factor.

While there are benefits from understanding that e-learning enables institutional transformation, it requires additional validation. Each level will need to be explored to gain a fuller understanding of e-learning as an IS change agent.

This research contributes to the understanding of how e-learning changes organisations that use it. For practitioners, it is important for senior managers to understand the need to support academics as they

experiment with e-learning and develop new innovative ways of teaching and learning, and to plan for the changes that experimentation brings. Senior managers need to consider the different strategies available to their organization and the resulting differences in e-learning impact. Academic staff who experiment with e-learning are driving the development of e-pedagogy and bringing about change in HE. Where the boundaries begin to blur between HEIs and other e-learning participants such as publishers, students will have access to new educational products, and as HEIs enter new markets, students will have access to a wider range of educational options.

The contribution here to theory is to consider e-learning as an IS, describe an e-learning continuum where differing levels of interaction determine the impact of different e-learning tools; and to determine in what ways e-learning is strategic for HEIs. The research applies Venkatraman's five levels of IT-induced organisational transformation to develop a model of e-learning induced organisational transformation. The e-learning transformation model enables an understanding of how universities may be transformed as they implement e-learning, develop new products, and enter new markets.

There appears to be evidence that progression from one level to another is not sequential - this phenomena needs further study. Will institutions that implement at higher levels without implementing at lower levels find difficulty in exploitation? Or will they be able to completely miss levels of exploitation? Or will they have to '*back fill'* and implement at the lower level after higher level exploitation? To address these questions a longitudinal study is required. This research has touched upon a number of areas that are not fully explored and require further research. First is the role of individuals with a relatively high degree of autonomy within an organisation, perhaps best conceptualized as a self-managing professional in what could be described as a professional organizational structure (Mintzberg, 1989). The question raised by this research is to what extent is successful exploitation of e-learning directed by senior management or by individual academics? The second opportunity is the categorisation of e-learning implementer. This research identified three categories of individuals implementing e-learning: *local implementer* exploiting e-learning at a local level without changing their approaches to teaching and learning; *developer*, who is involved in teaching and learning innovation; and *contractual implementer* who is implementing e-learning to fulfill contractual obligations, but may or may not be innovative in approach. This research does not address the extent that the role of contractual implementer is orthogonal to the other two roles of local implementer and developer. Finally, the research does not examine the use of social media in e-learning.

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